Life Cycle Assessment of bamboo (*guadua angustifolia* stems) as building material for structural applications.

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Bamboo products have been proven to be a good altemative to hardwoods in the production of building materia ls, thus reducing the risk of deforestation primarily in tropical areas. Furthermore, bamboo also benefits from a very fast growing capacity when cultivated under adequate conditions, the ability to grow in non-productive land (e.g. eroded slopes) and the capacity to re- sprout from its stump due to its resilient root structure. Furthennore, its extensive root network promotes carbon sequestration, facilitates protection against soil erosion and reduces water depletion. Besides, from a social and economic point of view, cultivation and commercial uti li zation of bamboo materials support local economies in rural areas of developing countries

Bam boo stems have excellent mechanical properties that allow its use as supporting structures replacing conventional construction materials such as hardwood, steel or precast concrete. The environmental benefits of usi ng this material need to be quantified. This paper investigates greenhouse gas (G HG) emissions and energy performance of bamboo stems *(guadua angustifolia)* produced in Colombia under semi industrial conditions and utilized in Spain. These sustainabi lity indicators are obtained using Life Cycle Assessment (LCA) methodology considering the following stages: stem harvesting in susta inably managed plantations, transport to processing plant, preservationldrying, transport to harbor, transport from harbor to harbor (from Colombia to Spain), transport to warehouse and storage. The functiona l unit considered in this assessment is a 6 meter-long stem, and the scenarios analyzed include steam diameters 6, 10 and 12 cm (weighing 10, 14 and 17 kg respectively, dry matter basis).

The calculations have been performed using Simapro 8 software and applying LCI databases from Ecoinvent v3 and ELCD v3. The environmental impacts associated with the consumption of electricity throughout the production, harvesting, processing and transportation of the bamboo materials have been adapted to the electricity mix in Colombia.